

Submit originals and one copy and electronic copy to Governance/Faculty Senate Office
 See <http://www.uaf.edu/uafgov/faculty/cd> for a complete description of the rules governing curriculum & course changes.

CHANGE COURSE (MAJOR) and DROP COURSE PROPOSAL

SUBMITTED BY:

Department	Chemistry & Biochemistry	College/School	CNSM
Prepared by	John Keller	Phone	474-6042
Email Contact	jvkeller@alaska.edu	Faculty Contact	

1. COURSE IDENTIFICATION:

Dept Course # No. of Credits

COURSE TITLE

2. ACTION DESIRED:

Change Course If Change, indicate below what change. Drop Course

NUMBER	<input type="text"/>	TITLE	<input checked="" type="checkbox"/>	DESCRIPTION	<input checked="" type="checkbox"/>
PREQUISITES	<input checked="" type="checkbox"/>			FREQUENCY OF OFFERING	<input checked="" type="checkbox"/>
CREDITS (including credit distribution)	<input type="text"/>	Dept.	<input type="text"/>	COURSE CLASSIFICATION	<input type="text"/>
CROSS-LISTED	<input type="text"/>	Dept.	<input type="text"/>	Course #	<input type="text"/>
STACKED (400/600) Include syllabi.	<input type="text"/>				
OTHER (please specify)	<input type="text"/>				

(Requires approval of both departments and deans involved. Add lines at end of form for such signatures.)

3. COURSE FORMAT

NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school's curriculum council. Furthermore, any core course compressed to less than six weeks must be approved by the core review committee.

COURSE FORMAT: (check all that apply) 1 2 3 4 5 6 weeks to full semester

OTHER FORMAT (specify all that apply)

Mode of delivery (specify lecture, field trips, labs, etc)

4. COURSE CLASSIFICATIONS: (undergraduate courses only. Use approved criteria found on Page 10 & 17 of the manual. If justification is needed, attach on separate sheet.)

H = Humanities S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core? YES NO

IF YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, Format 6 also submitted W = Writing Intensive, Format 7 submitted Natural Science, Format 8 submitted

5. COURSE REPEATABILITY:

Is this course repeatable for credit? YES NO

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

How many times may the course be repeated for credit? TIMES

If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course? CREDITS

RECEIVED

JAN 21 2011

Dean's Office

College of Natural Science & Mathematics

6. CURRENT CATALOG DESCRIPTION AS IT APPEARS IN THE CATALOG: including dept., number, title and credits

CHEM F324 W Organic Chemistry Laboratory (n)
4 credits
A laboratory course designed to illustrate modern techniques of isolation, purification, analysis and structure determination of covalent, principally organic, compounds. Enrollment limited. Contact department (474-5510) or fychem@alaska.edu early to get on the wait list. Special fees apply. Enrollment limited. Contact department (474-5510) or fychem@alaska.edu early to get on the wait list. Special fees apply. Prerequisites: ENGL F111X; ENGL 211X or ENGL F213X; or permission of instructor. Co-requisites: CHEM 322. (2 + 6)

7. COMPLETE CATALOG DESCRIPTION AS IT WILL APPEAR WITH THESE CHANGES: (Underline new wording strike through old wording and use complete catalog format including dept., number, title, credits and cross-listed and stacked.) PLEASE SUBMIT NEW COURSE SYLLABUS. For stacked courses the syllabus must clearly indicate differences in required work and evaluation for students at different levels.

CHEM F324 W Advanced Organic Chemistry Laboratory (n)
4 credits Offered Spring
A laboratory course designed to illustrate modern techniques of isolation, purification, analysis and structure determination of covalent, principally organic, compounds. Emphasis on research techniques including 2D nuclear magnetic resonance spectroscopy. Intended for chemistry majors. ~~Enrollment limited. Contact department (474-5510) or fychem@alaska.edu early to get on the wait list. Special fees apply. Prerequisites: ENGL F111X; ENGL 211X or ENGL F213X; CHEM F212; or permission of instructor. Co-requisites: CHEM 322. (2 + 6)~~

8. IS THIS COURSE CURRENTLY CROSS-LISTED?

YES/NO No If Yes, DEPT NUMBER

(Requires written notification of each department and dean involved. Attach a copy of written notification.)

9. GRADING SYSTEM: Specify only one

LETTER: X PASS/FAIL:

10. ESTIMATED IMPACT

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

This will be the same course essentially as current 324 W, except that it will be offered only once per year to coincide with the 2nd semester of organic chemistry lecture, Chem 322. The latter is now offered only in the Spring.

11. LIBRARY COLLECTIONS

Have you contacted the library collection development officer (kljensen@alaska.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

No X Yes Library collections are adequate. 99% of literature use is via Internet subscriptions to off-campus journal collections or scientific databases.

12. IMPACTS ON PROGRAMS/DEPTS:

What programs/departments will be affected by this proposed action?
Include information on the Programs/Departments contacted (e.g., email, memo)

This should have rather minor impact on other departments, since a larger enrollment organic chemistry laboratory course (Chem 323) will be given at the same time.

13. POSITIVE AND NEGATIVE IMPACTS

Please specify positive and negative impacts on other courses, programs and departments resulting from the proposed action.


JUSTIFICATION FOR ACTION REQUESTED


The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. If you ask for a change in # of credits, explain why; are you increasing the amount of material covered in the class? If you drop a prerequisite, is it because the material is covered elsewhere? If course is changing to stacked (400/600), explain higher level of effort and performance required on part of students earning graduate credit. Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the course is not compromised as a result.

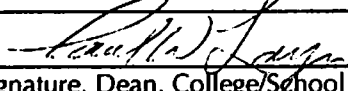
The main change here is the title of the course, which adds the word "Advanced". This is to distinguish this course from the new 3-credit course in organic chemistry laboratory course, Chem 323, which we are planning to offer next year pending approval. That course does need to keep the title "Organic Chemistry Laboratory" so that students taking the course, and anyone reading their transcripts, will know what kind of course it is. Therefore, a different title is needed for the existing course that more accurately reflects its content and distinguishes it from C323.

The "Advanced" term is based on the inclusion of 2D NMR spectroscopy and research methods in the course. Discussions with chemistry faculty at other universities suggest that very few undergraduate organic laboratory students learn to obtain, and interpret 2D NMR spectra. The reference to research methods in the description applies to our use of SciFinder Scholar to search the Chemical Abstracts database, and the incorporation of multi-week projects based on ongoing projects in the professors' labs.

APPROVALS:

	Date	21 Jan 2011
Signature, Chair, Program/Department of: Chemistry & Biochemistry		

	Date	7 Feb 2011
Signature, Chair, College/School Curriculum Council for: CSM		

	Date	2/11/11
Signature, Dean, College/School of: CSM		

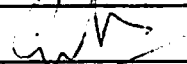
	Date	
Signature of Provost (if applicable)		

Offerings above the level of approved programs must be approved in advance by the Provost.

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE.

	Date	
Signature, Chair, UAF Faculty Senate Curriculum Review Committee		

ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking)

	Date	26 Jan 2011
Signature, Chair, Program/Department of: Biology & Wildlife		

	Date	
Signature, Chair, College/School Curriculum Council for:		

	Date	
Signature, Dean, College/School of:		

ATTACH COMPLETE SYLLABUS (as part of this application).

Note: The guidelines are online: <http://www.uaf.edu/uafgov/faculty/cd/syllabus.html>

The department and campus wide curriculum committees will review the syllabus to ensure that each of the items listed below are included. If items are missing or unclear, the proposed course change will be denied.

SYLLABUS CHECKLIST FOR ALL UAF COURSES

During the *first* week of class, instructors will distribute a course syllabus. Although modifications may be made throughout the semester, this document will contain the following information (as applicable to the discipline):

1. Course information:

Title, number, credits, prerequisites, location, meeting time
(make sure that contact hours are in line with credits).

2. Instructor (and if applicable, Teaching Assistant) information:

Name, office location, office hours, telephone, email address.

3. Course readings/materials:

Course textbook title, author, edition/publisher.
 Supplementary readings (indicate whether required or recommended) and
 any supplies required.

4. Course description:

Content of the course and how it fits into the broader curriculum;
 Expected proficiencies required to undertake the course, if applicable.
 Inclusion of catalog description is *strongly* recommended, and
 Description in syllabus must be consistent with catalog course description.

5. Course Goals (general), and (see #6)

6. Student Learning Outcomes (more specific)

7. Instructional methods:

Describe the teaching techniques (eg: lecture, case study, small group discussion, private instruction, studio instruction, values clarification, games, journal writing, use of Blackboard, audio/video conferencing, etc.).

8. Course calendar:

A schedule of class topics and assignments must be included. Be specific so that it is clear that the instructor has thought this through and will not be making it up on the fly (e.g. it is not adequate to say "lab". Instead, give each lab a title that describes its content). You may call the outline Tentative or Work in Progress to allow for modifications during the semester.

9. Course policies:

Specify course rules, including your policies on attendance, tardiness, class participation, make-up exams, and plagiarism/academic integrity.

10. Evaluation:

Specify how students will be evaluated, what factors will be included, their relative value, and
 how they will be tabulated into grades (on a curve, absolute scores, etc.)

11. Support Services:

Describe the student support services such as tutoring (local and/or regional) appropriate for the course.

12. Disabilities Services:

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials.

State that you will work with the Office of Disabilities Services (208 WHIT, 474-5655) to provide reasonable accommodation to students with disabilities."

CHEMISTRY 324W **Spring 2012**
ORGANIC LABORATORY

Lecture:Monday and Friday 2:15-3:15; Reichardt 165
Lab:Tues and Thurs., 2:00-5:15; Reichardt 137
Instructor:.....John Keller, Office 161 Nat Sci, 474-6042; jwkeller@alaska.edu
.....Office hours by appointment, or drop-in.
Teaching Assistant TBA

Required Materials: (1) PAVIA et al. , MICROSCALE+MACROSCALE TECH.IN ORGAN.LAB , \$112 new at the UAF bookstore, \$84 used. Amazon.com: \$106 new, with free shipping, \$48 used + \$4 shipping
(2) 8"x10" bound notebook.

Recommended Materials: USB memory stick for backing up data and text files

Fees: (1) Material fee for chemicals, glassware breakage, and other supplies \$120
 (2) chemistry computer lab fee \$45 (charged only once for multiple chem classes)
 (3) key deposit \$5 cash (Bring it to first lab Tuesday)

Course Description (from catalog):

A laboratory course designed to illustrate modern techniques of isolation, purification, analysis and structure determination of covalent, principally organic, compounds. Emphasis on research techniques including 2D nuclear magnetic resonance spectroscopy. Intended for chemistry majors. Special fees apply. *Prerequisites: ENGL 211X or ENGL F213X; CHEM F212; or permission of instructor. Co-requisites: CHEM 322. (2 + 6)*

Course Goals: This course emphasizes several aspects of organic laboratory practices. These include:

- 1) Synthetic procedures
- 2) Chromatographic analysis (gc, tlc, and hplc)
- 3) Standard work-up procedures
- 4) Purification techniques (crystallization, distillation, extraction, chromatography...)
- 5) Spectroscopic analyses (NMR, MS, and IR)
- 6) Literature searches
- 7) Scientific writing
- 8) Use of relevant computer software
- 9) Chemical calculations including stoichiometry

Experiment sources: While the text for this course is an excellent guide to the techniques used by organic chemists, it is not a source of standard organic laboratory experiments. Rather, the experiments will come from handouts or directly from the chemical literature. In some cases the handouts will describe experimental details of syntheses **related** to the actual ones we will pursue. Consequently, the precise details of the procedure you will follow may differ in terms of the reagents, reaction times, reaction scale, apparatus setup, and scale of the experimental. This approach will provide you with the experience of using procedures from the chemical literature as templates for designing your own synthetic strategies. *Because the details of each experiment will be explained in lecture, it is imperative you attend (and be on time).*

The following references may be useful and should be found in (and should not be removed from) the laboratory:

- *Aldrich Chemical Catalog* gives physical properties as well as safety issues for most commercially available organic reagents. (You can order your own free.)
- *The Merck Index* is an excellent reference book for over 10,000 important organic substances. It has a handy cross index and molecular formula index that you will find useful.
- *The CRC Handbook* is another reference book that provides some physical and spectral information on a wealth of substances. (The Merck Index is easier to use and more relevant.)
- *Advanced Organic Chemistry: Reactions, Mechanisms, and Structure* by March (McGraw-Hill) is particularly useful because it provides good references to the chemical literature.
- *The Chemist Companion: A handbook of practical data, techniques, and references* by A.J. Gordon and Richard A. Ford (John Wiley & Sons) is an good source of information for all chemists (inorganic, organic, analytical...).
- *Reagents for Organic Synthesis* by Fieser and Fieser, volumes 1-13 (John Wiley & Sons) has detailed discussions about nearly every organic reagent with references to the chemical literature. At times details about how the reagent is typically used in a given reaction is provided.
- *Organic Synthesis*; collective volumes 1-5 (John Wiley & Sons) provides very detailed procedures for specific syntheses. The scale of the reactions, however, is usually large.
- *Spectroscopic Identification of Organic Compounds*; 6th Ed., by R.M. Silverstein, G.C. Bassler, and T.C. Morrill (John Wiley & Sons) provides good discussion and extensive tables for the interpretation of standard IR, H NMR, C NMR, and mass spectra. More advanced topics such as 2-D NMR and NMR of other nuclei are also discussed.
- WWW.HAZARD.COM is a good on-line source of Material Safety Data Sheets (MSDS). The department also keeps a set of MSDS in NSF 139.
- Scifinder Scholar – literature searching
- ACD labs NMR software
- HyperChem software for molecular calculations
- Japan spectral database <http://riodb01.libbase.aist.go.jp/sdbs/>

Laboratory Safety: Laboratory safety is a major concern of all chemical laboratories but is especially important in organic labs due to the presence of flammable solvents, potentially hazardous fumes, highly reactive reagents, etc. The first lab (Tuesday Sept 7) will deal explicitly with these hazards and the appropriate safety measures to follow. Subsequent lectures, besides covering the theory and practicalities of the next week's experiment will also cover specific hazards that you may encounter. Please attend these lectures and be prepared for the lab by doing any assigned readings and having your notebook prepared before coming to lab. If you are not prepared for lab you may be asked to leave.

Course requirements:

I. A written report is required for each experiment. Some will be shorter, others longer.
Other details:

1. Prepare using Microsoft Word, or compatible, software.
2. Please use the spelling and grammar checkers before handing anything in!
3. Submit in both hard copy (stapled) and electronic form, formatted identically. The hard copy should be printed on the Kyocera Color Laser (room 172) or similar printer and placed in JK's mailbox in the Chemistry office 194 NSF. The electronic copy should be emailed to JK.
4. Chemical structures can be drawn neatly by hand or using computer software (ChemWindow, or ACD/ChemSketch - the latter is free download from the Internet, and both are installed on Chem Computer Lab workstations). Chemical structures, reactions, and mechanisms should be inserted directly in the text, not at the end.
5. IR and NMR spectra should be pasted as graphics in a separate section of "Figures" at the end of the report.
6. The report format is the usual one used in the sciences: Introduction, Methods, Results, Discussion, Acknowledgments, References. Include figures such as NMR spectra at the back.
7. Formatting: Use 12-pt Times Roman font, single space, margins 1" all around.

Some notes on the different sections of chemistry reports:

- ✓ Introduction: Describe the chemistry goals for the experiment. Write a balanced chemical equation for the reaction, if any.
- ✓ Methods: Describe your procedure in passive voice, third person language. Be succinct, but do not leave out important details. We will learn how to write these by reading some from the original literature.
- ✓ Results: The percent yield along with an estimation of product purity by spectroscopic and/or chromatographic analyses.
- ✓ Results: Spectra (usually IR and/or NMR) along with their interpretation, which means writing out descriptions of where the peaks are, and which atoms or groups caused those peaks, and why you assigned those atoms. In particular, evidence for the presence or absence of any possible contaminants should be addressed by a detailed examination of the spectra, using reference spectra when available. Be sure to include a discussion of the integration analysis of the ^1H -NMR spectra.
- ✓ NB. Please **do not refer to or display NMR spectra calculated by ACD software anywhere in the report**. Use the data in the spectrum itself, and if necessary, chemical shift or frequency correlation tables from your text(s).
- ✓ Gas chromatographic traces, if required, should be included and peak identification should be attempted.
- ✓ Discussion: A detailed mechanism using curved arrows. Indicate reversible and irreversible steps. Good idea to label intermediate structures (1, 2, 3) then in a separate paragraph, explain what is happening in each step.
- ✓ Discussion: if there are contaminants in the isolated product, point out how the experimental procedure minimized the formation of any of these contaminants (for instance the use of a large excess of one reagent will tend to consume the limiting reagents).
- ✓ Acknowledgments of any student whose data is used in your report. **Do not** acknowledge the teaching assistant or professor.
- ✓ References used, if any. Use the Endnote application available in the Chemistry Computer Lab. NEVER include a reference without a reference to it (a "callout" in publishing lingo) appearing SOMEWHERE in the text!

II. **Writing Intensive designation.** A description of what a writing intensive course such as this is found on the university web-site: <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-/guidelines-for-core-desig/> In brief, the W designator means that a majority of your grade is based on your written work, that some of the work will be resubmitted with revisions based on previous comments, and that factors such as content, organization, tone, word choice, grammar, spelling, sentence structure, etc., contribute to the final grade.

Please Note: The prerequisite for all W courses is Engl 211X or 213X.

While you are encouraged to collaborate with your classmates in interpreting your data and proofreading your reports, it is essential that you write your reports independently. Each paragraph should portray your own creativity and not simply paraphrase someone else's writing. It is a common misconception that changing the word choice, sentence structure or organization of an existing document protects against a charge of plagiarism; it does not.

Figures in Reports. You may use another student's figures in a report if such a move is (1) approved by the other person, and (2) proper credit is given in the Acknowledgements to the individual who created them.

III. For most experiments, you will also hand in your chemical product. Put the compound in a vial with a piece of foil as a cap-liner (to prevent contamination by the cardboard cap-liner). Always label the vial neatly with your name, compound, mass and mp or bp. **Poorly labeled vials may be disposed of by chemistry personnel during routine cleanups. NEVER DISPOSE OF YOUR PRODUCT UNTIL YOUR REPORT HAS BEEN GRADED!!** Store in the refrigerator or freezer until it is time to hand it in to prevent evaporation or degradation.

IV. Maintain an up-to-date notebook. Before each lab you should enter (i) a balanced chemical equation, (ii) a procedural outline or flow chart, and (iii) physical and hazardous properties for each chemical (including solvents) you plan to use in the experiment. Obtain this information from the Web – for example, if you look up the compound at the Aldrich Chemical Co web site - <http://www.sigmaaldrich.com/catalog/search/AdvancedSearchPage> then follow the link to MSDS, the Material Safety Data Sheet will provide the appropriate information. *(Please keep in mind that the MSDS info is geared to handling chemicals on the industrial scale.)* During the lab make notes on (i) your actual procedure including weighing data, (ii) significant visual observations, (iii) TLC sheets taped in, including solvent info, and (iv) spectra or references to location of spectra in a separate collection. DATE each page or entry.

V. Reports and products are due on Mondays by 6:00 PM two weeks after the scheduled lab. This is considered ample time for you to complete the project. Late reports may result in a reduction of points.

VI. Notebooks will be collected several times (unannounced) during the semester and returned graded by the next lab period.

VII. The final weeks of laboratory will be devoted to a "Research Project". Using methods from the text, you will try to solve a problem such as devising a synthesis or determining a mechanism. Your final report will be in two forms: (1) a "public" poster presentation at the end-of-the-semester chemistry potluck/poster show on the Thursday of the last week of classes, and (2) an article in the style of the *Journal of Organic Chemistry*.

Lectures. It is essential that you attend all lectures and arrive on time to the laboratory in order to fully understand the experiment and safety issues.

Each lecture will begin by pointing out salient features for the upcoming experiment. Questions regarding 1) the choice of solvent, 2) order of addition, 3) which reagent to use in excess, 4) work-up steps, 5) appropriate stopping points, etc., will be addressed. In addition, as time allows, other topics will be covered that are described in the syllabus. Much of the midterm exam will come from these lectures..

Some experiments may have to be modified from the description given in the handouts. These modifications may include 1) reduction in the scale of the reaction, 2) changes in the glassware used, 3) additional analyses of the final product, and 4) alternative reagents, solvents or starting materials. A discussion of these modifications will be presented in the lecture and possibly at the beginning of the lab itself. **This is why lecture attendance is mandatory. Also, always check the marker board in lab (137 NSF) for important announcements.**

Grades: The final letter grade will be based on the total number of points accrued during the semester, apportioned as follows. (+/- grades may be used).

Experiments 1, 3, 6, 7 & 8 (50 pts each)	250
Experiments 2, 4, and 5 (100 pts each)	300
Project (Poster 100; Report 100)	100
Notebook	100
Total	850

Students with documented disabilities who may need reasonable academic accommodations should discuss these with me during the first two weeks of class. You will need to provide documentation of your disability to Disability Services in the Center for Health and Counseling, 474-7043, TTY 474-7045.

Week of	Topics	New Techniques	Readings
30-Aug	Fri introduction	Computer lab	
6-Sep	No class Mon. Tues: Check in, safety lecture; \$5 Exp 1: Spectroscopic Analysis of Unknown	Safety, Laboratory Notebook IR, NMR Sample Prep	Chapter 2, 26.1, 26.4-26.7 Text NMR,IR
13-Sep	Exp 2: Stereospecificity in Metal Hydride-Ketone Reduction	Computational Chemistry, NMR Coupling Constants, Anisotropy effects in NMR, TLC, Extraction & Drying Agents	Chapter 12, 20, 29, 26.10, 26.8
20-Sep	Catch up - write reports		
27-Sep	Exp 3: Fragrance analysis-MS fragmentation	Gas chromatography-mass spectroscopy; computational	Ch 18, 12, 22
4-Oct	Exp 4: Fisher Esterification	Simple Distillation, COSY, HSQC NMR	Chapter 7,14
11-Oct	Exp 5: Green chemistry – Cu/SnCl ₂ allylation		
18-Oct	Exp 5 con't acetonide form'n	gNOESY NMR	Chapter 9,11
25-Oct	Exp 6 Aldol	Recrystallization, melting point	
1-Nov	Exp 7: Diels-Alder Library	SciFinder Scholar/Science Citation Index	
8-Nov	Project		
15-Nov	Project	Flash Chromatography	
22-Nov	Project	Thurs, Fri No lab, class	
29-Nov	Project		
6-Dec	Work on posters – must by submitted Wed AM	Thursday- Dec. 9 1, Dept Poster Session 3-6 PM	
13-Dec	Check out Mon	Thurs Dec 16, 1-3 PM Class review of posters	

	Writing Int?	Due date
Expt 1 (Unknown)	No	9-27
Expt 2 (Hyride)	Yes	10-4
Expt 3 (Fragrance)	No	10-18
Expt 4 (Fisher)	Yes	10-25
Expt 5 (Grign)	Yes	11-15
Expt 6 (Aldol)	No	11-29
Expt 7 (Diels-Ald-Lit)	No	12-6
Project	Yes	Poster: 12-7 Report 12-16